

WHAT IS CLAIMED IS:

1. A method of providing exhaust gas recirculation (EGR) in a multi-cylinder engine, each engine cylinder having at least one engine valve, intake and exhaust manifolds, and a valve actuator, said method comprising the steps of:

imparting motion to the valve actuator;

actuating the engine valve of a first engine cylinder responsive to the imparted motion;

determining a first and a second engine parameter level;

modifying the imparted motion responsive to the level of the first engine parameter level and the second engine parameter level to produce an exhaust gas recirculation event.

2. The method of Claim 1, wherein the step of modifying the imparted motion further comprises the step of closing the engine valve before the second engine parameter level exceeds the first engine parameter level.

3. The method of Claim 2, wherein the engine valve comprises an exhaust valve.

4. The method of Claim 3, wherein the first engine parameter value comprises exhaust manifold pressure, and the second engine parameter value comprises engine cylinder pressure.

5. The method of Claim 2, wherein the engine valve comprises an intake valve.
6. The method of Claim 5, wherein the first engine parameter value comprises engine cylinder pressure, and the second engine parameter value comprises intake manifold pressure.
7. The method of Claim 1, wherein the step of imparting motion further comprises the step of imparting motion corresponding to a main valve event of a second engine cylinder.
8. The method of Claim 7, wherein the main valve event comprises a main intake event.
9. The method of Claim 1, wherein the step of modifying the imparted motion further comprises the step of utilizing an exhaust gas pulse from a second engine cylinder to facilitate the recirculation of gas into the first engine cylinder.
10. The method of Claim 9, wherein the exhaust manifold comprises a split exhaust manifold.

11. The method of Claim 1, wherein the step of modifying the imparted motion further comprises the step of utilizing an exhaust gas pulse from one of a second engine cylinder or a third engine cylinder to facilitate the recirculation of gas into the first engine cylinder.

12. The method of Claim 11, wherein the exhaust manifold comprises a non-split exhaust manifold.

13. A system for providing exhaust gas recirculation (EGR) in a multi-cylinder engine having a housing, each engine cylinder having at least one engine valve, and intake and exhaust manifolds, said system comprising:

an EGR housing disposed on the engine housing, said EGR housing having an hydraulic passage formed therein;

means for actuating the engine valve of a first engine cylinder;

means for imparting motion to said valve actuation means; and

means for modifying the motion imparted to said valve actuation means to produce an EGR event having an early valve closing time.

14. The system of Claim 13, wherein said valve actuation means comprises:

a master piston assembly slidably disposed in a first bore formed in said EGR housing; and

a slave piston assembly slidably disposed in a second bore formed in

said EGR housing, said slave piston assembly in communication with the master piston assembly through the hydraulic passage.

15. The system of Claim 14, wherein said motion modifying means is disposed in said master piston assembly.

16. The system of Claim 14, wherein said motion modifying means is disposed in said slave piston assembly.

17. The system of Claim 13, wherein the imparted motion corresponds to a main valve event of a second engine cylinder.

18. The system of Claim 17, wherein the main valve event comprises a main intake event.